



Research Paper

A CLINICAL STUDY TO ASSESS THE EFFECT OF PROPHYLACTIC INTRACAMERAL MOXIFLOXACIN ON INCIDENCE OF ENDOPHTHALMITIS IN HIGH VOLUME SURGERY SETUP

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Endophthalmitis is still the major post operative complication of ocular surgery. Most common cause for endophthalmitis to develop after ocular surgery is the inhabitant microbial flora of conjunctiva and periocular tissue. This study was conducted with the aim to assess the effect of prophylactic intracameral moxifloacin on incidence of endophthalmitis in high volume surgery setup. Patient were divided into two groups, group 1 which didn't received intracameral moxifloxacin at the end of surgery and group 2 which received prophylactic intracameral moxifloxacin at the end of surgery. We have achieved zero incidences of endophthalmitis with intracameral moxifloxacin. Our findings consolidate the view that use of intracameral antibiotics decreases the rate of enophthalmitis.

Keywords: Endophthalmitis, Intracameral, Moxifloxacin, Prophylactic

INTRODUCTION

Endophthalmitis is still major concern after ocular surgery with incidence varying from 0.04% to 0.4 % worldwide (Teban *et al.*, 2005; Wes *et al.*, 2005; Jonson *et al.*, 1997; Walker and Claoue, 1986; Srinivasan *et al.*, 1999). Despite the use of povidone iodine and prophylactic topical antibiotic incidence still increased during 1994 -2001 in Europe (Wes *et al.*, 2005). There are various causes due to which endophthalmitis develop after ocular surgery but several studies shows

that the most common source of infection is inhabitant microbial flora of conjunctiva and periocular tissue (Teban *et al.*, 2005; Jonson *et al.*, 1997; Walker and Claoue, 1986; Srinivasan *et al.*, 1999). Although povidone iodine with topical antibiotic is recommended prophylactic method but studies are available which shows its sterilization efficacy is up to 83% eye (Cuilla, 2002; Isenberg, 1997). Mode of inoculation is usually intraoperative entry during surgery through the contaminated instrument, contaminated irrigation

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fluid or postoperative entry, if wound is not properly sealed (Srinivasan, 1999).

To combat this intraoperative inoculation various studies suggest the role of intracameral antibiotics. Results of these studies have shown significant reduction in endophthalmitis after prophylactic intracameral antibiotic instillation (Seal *et al.*, 2006; ECRS, 2007; Leaming, 2004).

But, all these studies were conducted in hospitals where patient belonged to high socioeconomic status and were literate while to the best of our knowledge no clinical data or studies are available which shows reduction in endophthalmitis after intracameral moxifloxacin use, in high volume surgery hospital where patient has poor hygiene and are illiterate. Moreover in these studies results were usually compared with literature or data from the other setting so they don't give strong evidence of reduced incidence of endophthalmitis in same setting.

The aim of this study was to assess the effect of prophylactic intracameral moxifloxacin on incidence of endophthalmitis in high volume surgery setup.

MATERIALS AND METHODS

This was a retrospective analysis of 5040 case sheets of all types of cataract surgery operated from May 2010 to April 2012. In this study inclusion criteria were uncomplicated and complicated cataract surgeries both, combined cataract and trabeculectomy and high risk cases those are vulnerable to infection, i.e., lacrimal passage block cases with clear water regurgitation. Only exclusion criteria was patient who didn't completed their 1 month follow up.

All surgeries were done by single surgeon and at single site. Operating method were SICS, phacoemulsification and combined SICS + trabeculectomy. Patient were divided into two groups, group 1 which didn't received intracameral moxifloxacin at the end of surgery and group 2 which received prophylactic intracameral moxifloxacin at the end of surgery. Method of injection was simple, 0.5% moxifloxacin was taken in to tuberculin syringe by 26 gauge needle, directly from commercially available bottle, then 0.1 mL or 4 units of drug injected into capsular bag through 27 g cannula at the conclusion of the surgery via sideport incision, then wound is further rehydrated for tight closure.

Both the groups were divided in subgroups for further comparison; (A) Uncomplicated cataract; (B) combined cataract +trabeculectomy cases; (C) Complicated cataract or difficult cases; and (D) cases having lacrimal passage block with clear water regurgitation on syringing.

Evaluation criteria's were (1) Incidence of endophthalmitis; (2) Corneal status; (3) Anterior chamber reaction. Endophthalmitis was diagnosed by anterior chamber reaction with vitritis obscuring secondary retinal vessels along with pain and congestion. Corneal status was determined by corneal oedema with descemet's fold >5 at center of cornea and anterior chamber reaction evaluated by grading of cells and flare based on Hogan's criteria.

RESULTS

6 Cases of Endophthalmitis were Reported in Group

1 out of 2630 patient (Table 1) who didn't received intracameral moxifloxacin while out of 2410 patient of group 2 (Table 1) which received intracameral moxifloxacin, no endophthalmitis found.

There was reduction in incidence of endophthalmitis in group 2 (0%) in comparison to group 1 (0.23%). All the 6 reported cases belong to uncomplicated subgroup (A) of group 1, and presented after 10th postoperative day. Out

of 6 patients, 4 patients were managed in the same hospital with core vitrectomy and intravitreal antibiotics, 2 were found to be positive for gram positive cocci in vitreous aspirates.

Table 1: Patient Distribution

	Total patient	Subgroup A	Subgroup B	Subgroup C	Subgroup D
Group 1	2630	2304	144	72	110
Group 2	2410	2100	134	80	96
Total	5040	4404	278	152	206

Table 2: Percentage of Patients with Corneal Oedema and SK on 1st, 7th & 30th Post Operative Day

Uncomplicated cataract	Day 1	Day 7	Day 30
Group 1	11	6	0.1
Group 2	15	5	0
Cataract + trab			
Group 1	52	10.4	2.1
Group 2	65	11.94	2.2
Complicated cataract			
Group 1	69.5	36	5.5
Group 2	81.2	42	5
Passage block cases			
Group 1	30	11	0.2
Group 2	32	12.6	0.2

Table 3: Percentage Of Patients With Anterior Chamber Reaction on First Post Operative Day

Ant chamber reaction	Group 1				Group 2			
	A	B	C	D	A	B	C	D
Trace	15	0.0	0.0	10	13	0.0	0.0	9.5
Grade 1	47.5	17.7	11.1	25.	45	9.7	5	25.5
Grade 2	37	73.7	77.8	64	41	80.5	85	61.0
Grade 3	0.47	8.4	11.1	0.0	0.38	9.8	10	0.0

Subgroup analysis on 1st postoperative day shows, slight higher corneal odema and striate keratopathy in all the subgroups of group 2 in comparison to subgroups of group 1, while almost same percentage of patient have corneal oedema on 7th postoperative day and 30th postoperative day in both the groups (Table 2).

Anterior chamber reaction was slight higher in all the subgroups of group 2 in comparison to group 1 on first postoperative day, almost similar reaction was observed in both the groups on 7th and 30th postoperative day (Table 3 and Table 4).

DISCUSSION

Endophthalmitis is usually caused by inhabitant microbial flora of conjunctiva and periocular tissue which most probably enters during the surgery. To prevent this inoculation most commonly used antibiotics are cefuroxime, vancomycin and moxifloxacin. Cefuroxime and vancomycin commonly used in Europe (Seal *et al.*, 2006; ECRS, 2007; Leaming, 2004) and US, respectively. But both these have time dependent killing property (Monton *et al.*, 2002; Gimbel, 2000) and requires reconstitution before use so there are increased chances of contamination and TASS. Because of the risk to emergence of resistant bacteria American academy

discourages the use of prophylactic vancomycin. Axer-siegel *et al.* (1999) also shows increased risk of cystoids macular edema after use of intracameral vancomycin. Although intracameral use of cefuroxime shows significant reduction in endophthalmitis in ESCRS Study (Seal *et al.*, 2006; ECRS, 2007) but its efficacy to gram negative bacteria ((Monton *et al.*, 2002; Han, 1997), time dependent curve (Monton *et al.*, 2002), reconstitution before use, makes its choice questionable.

Our choice was intracameral moxifloxacin because it doesn't require reconstitution before surgery, its osmolality 290 mOsm/kg and pH 6.8 is compatible with human eye thus reducing the chances of TASS (Kowalski, 2005; Stroman, 2005). Moxifloxacin has lowest mean inhibitory concentration dose for commonest microbes causing endophthalmitis,¹⁶⁻¹⁸ its concentration remain above the MIC up to 5 h (Stroman, 2005; Espiritu, 2007; Obrien, 2007). Moxifloxacin has broad spectrum activity against gram positive, gram negative bacteria and atypical mycobacterium as well as anaerobes (Stroman, 2005; Espiritu, 2007; Obrien, 2007).

We have achieved zero incidences of endophthalmitis with intracameral moxifloxacin. Our findings consolidate the view that use of

Table 4: Percentage of Patients with Anterior Chamber Reaction on 7th Post Operative Day

Ant chamber reaction	Group 1				Group 2			
	A	B	C	D	A	B	C	D
Trace	73.6	23	27.8	27	77	23.1	30	30.5
Grade 1	26.4	73.6	66.7	69	23	75.3	66.3	67.3
Grade 2	0.0	3.4	5.5	3.6	0.0	1.5	3.7	2.1
Grade 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

intracameral antibiotics decreases the rate of endophthalmitis. Moreover the incidence of endophthalmitis reported were higher in high volume surgery or where patient belongs to low socioeconomic status than with low volume surgery (Ravilla *et al.*, 2009).

Our results were similar to previous studies which show anterior chamber reaction and corneal edema were similar on 7th and 30th postoperative day in both groups (Espiritu, 2007; O'Brien, 2007).

On the basis of above results, we can conclude that intracameral moxifloxacin significantly reduces the incidence of endophthalmitis even in high volume surgery. Further studies are needed to establish it as a routine prophylactic measure in high volume surgeries.

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